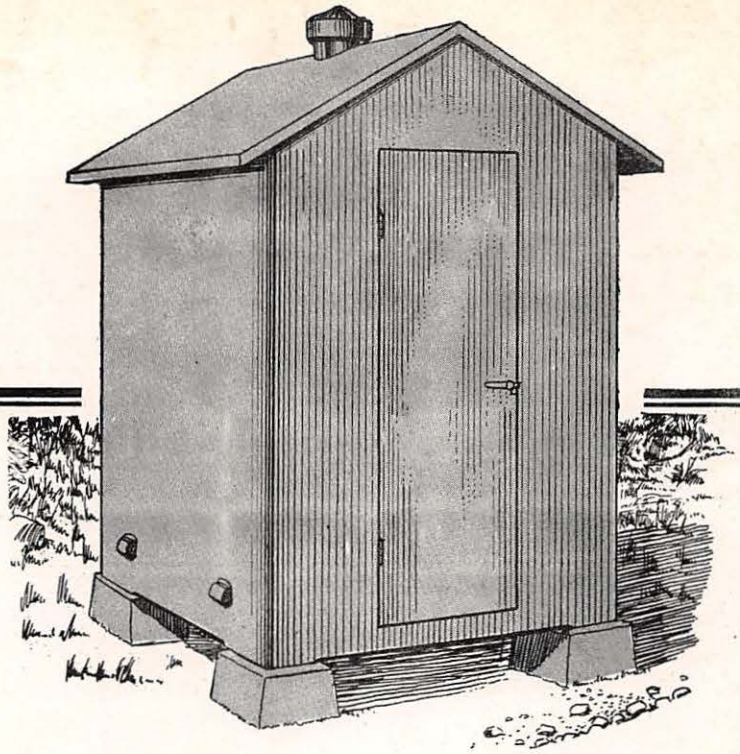


Union
Steel Relay Houses

U.D.
No.186

Union Switch & Signal Co.

Swissvale, Pa.

Peteprinted IN U.S.A.

Union Switch & Signal Co.

SWISSVALE, PA.

Subject: Steel Relay Houses

Union Development

Number: 186

Date: Aug. 4, 1931

Sheets

A house for the protection of the vital controlling and power elements of a Railway Signaling System should be constructed so as to last the natural life of the equipment installed. It must be waterproof and afford a convenient means for the disposal of a wide variety of essential control and affiliated apparatus. Due to extensive experience in this field, the Union Company is able to offer to the railroads a line of Steel Relay Houses which not only fulfill these major requirements, but also include facilities of such practical nature that their use is economically justified.

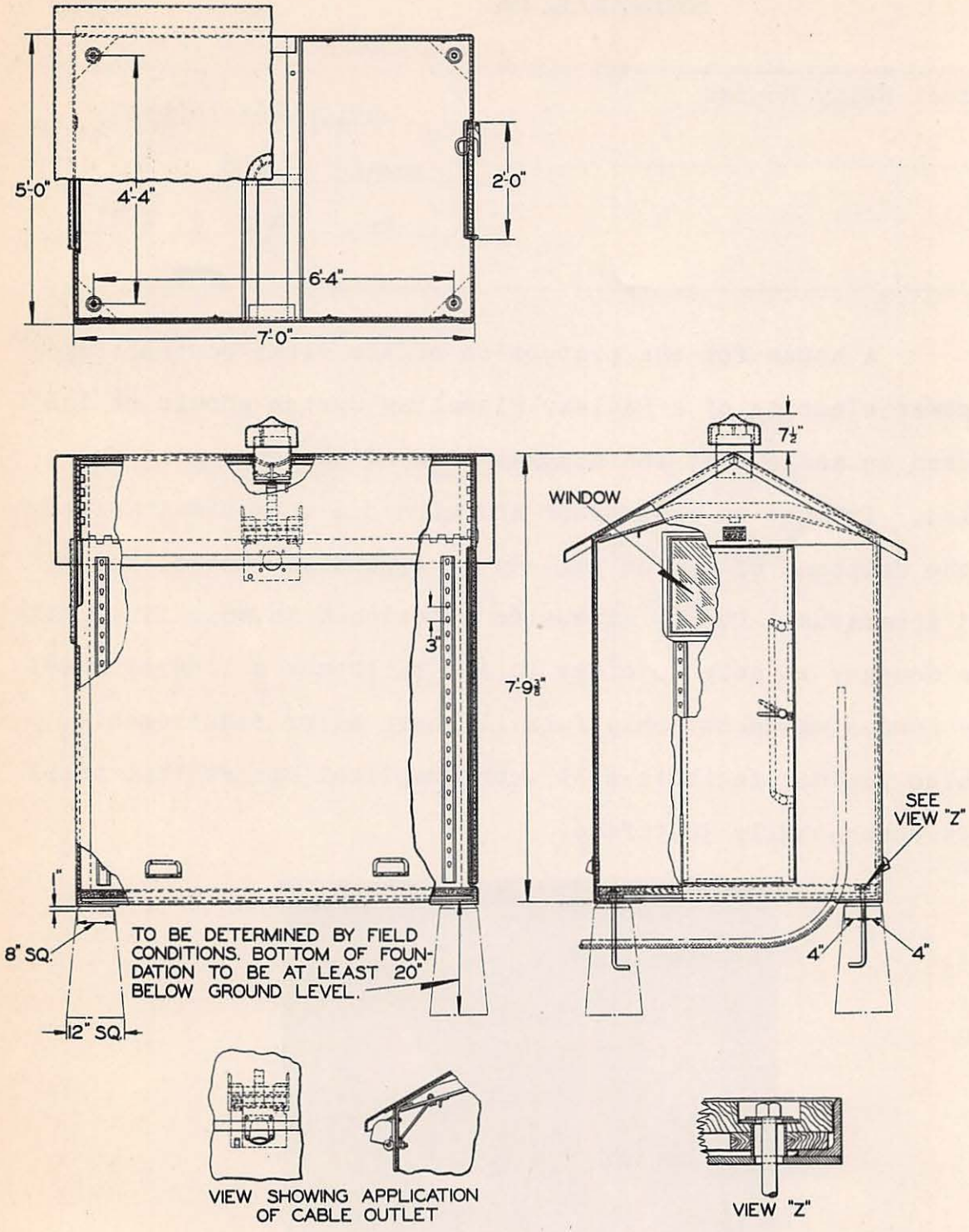


Fig. 1.....5 ft. x 7 ft. size of Union Sheet Steel Relay House showing features of construction. Note particularly the vertical channels which have slotted holes punched every 3 in. for receiving the heads of supporting bolts for wall boards or brackets for shelves, etc.

Detail Features

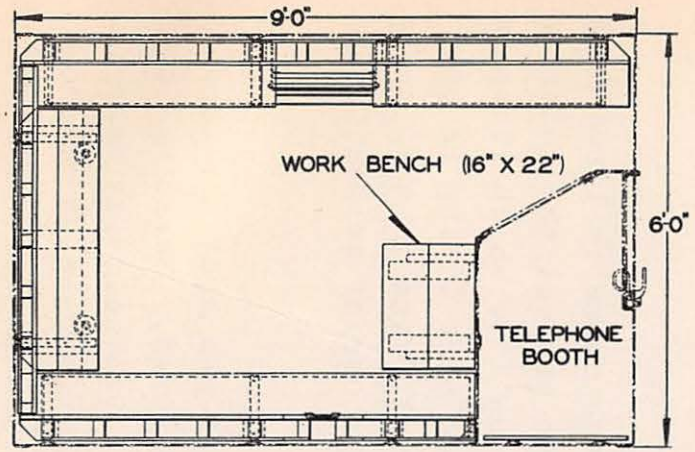
1. Substantial - The sheet steel walls are arc welded to an angle iron base structure, reinforced with gusset corner plates by which the house is secured to four small concrete foundation piers.

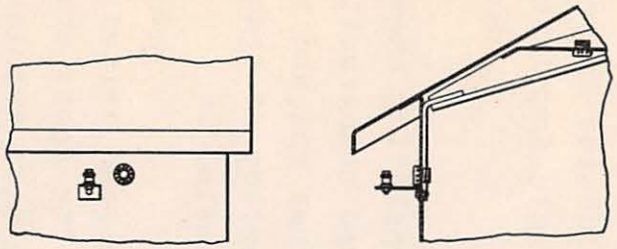
2. Durable - Copper Bearing 1/8" rust resisting sheet steel is employed and rugged construction is used throughout. The rear end and two sides each consist of one piece of sheet steel reinforced with channels.

3. Weatherproof - All exposed joints are arc seam welded throughout their entire length. The doors are snugly fitted and weatherstripped with tubular rubberized canvas packing, and, as shown in Fig.7, have a substantial two point locking device. Doors may be padlocked on the outside and handles are provided to close and open them from the inside.

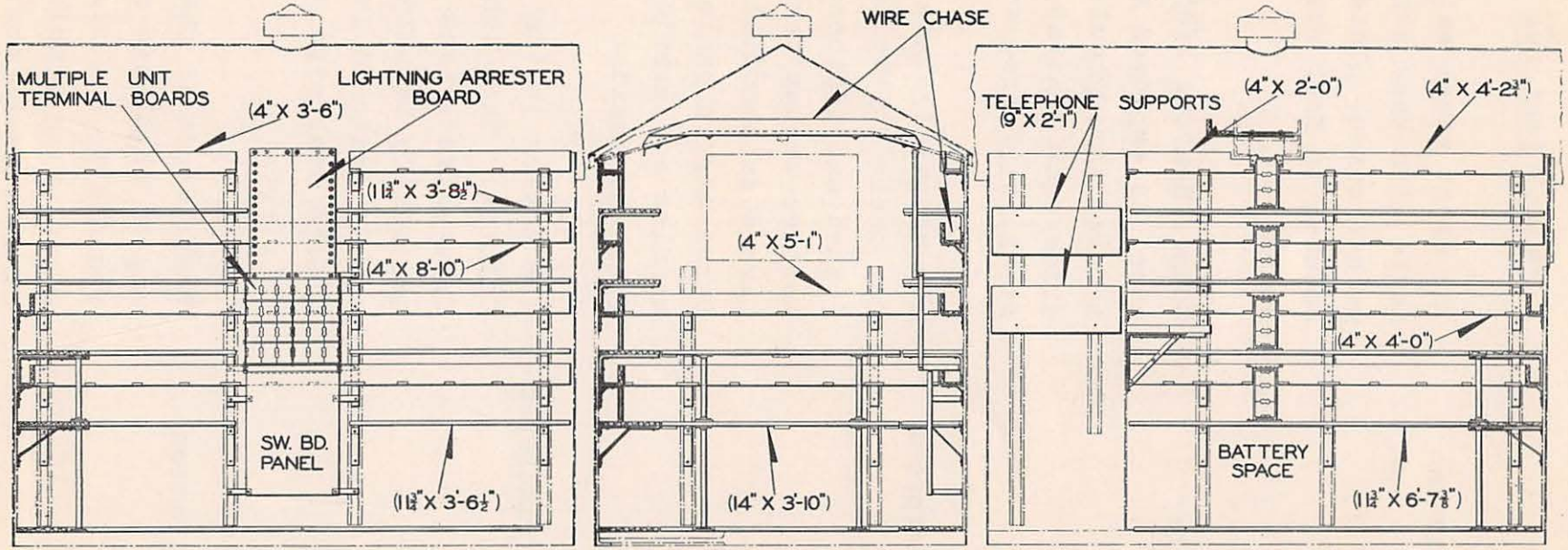
4. Heat Insulated - The entire inside of the house is lined with Celotex. This tends to protect the contents from extreme heat and cold to which it would ordinarily be subjected. The lining is securely fastened by novel means to the inside of the case without the use of screws, nails or rivets.

5. Ventilation - Ventilators in the roof and near the base may be regulated as desired. Sweating is reduced to a minimum. Provision is made for a rear window which swings open at the top. In some cases where the wall space is needed





VIEW SHOWING APPLICATION OF TELEPHONE WIRE OUTLET



R.H. SIDE OF HOUSE — REAR VIEW OF HOUSE — L.H. SIDE OF HOUSE

Fig. 2.....Plan of **Union Steel** Relay House showing typical arrangement of shelves, wire chases, terminal boards, battery racks, etc. It is interesting to note that a telephone booth and a work bench are provided in this scheme.

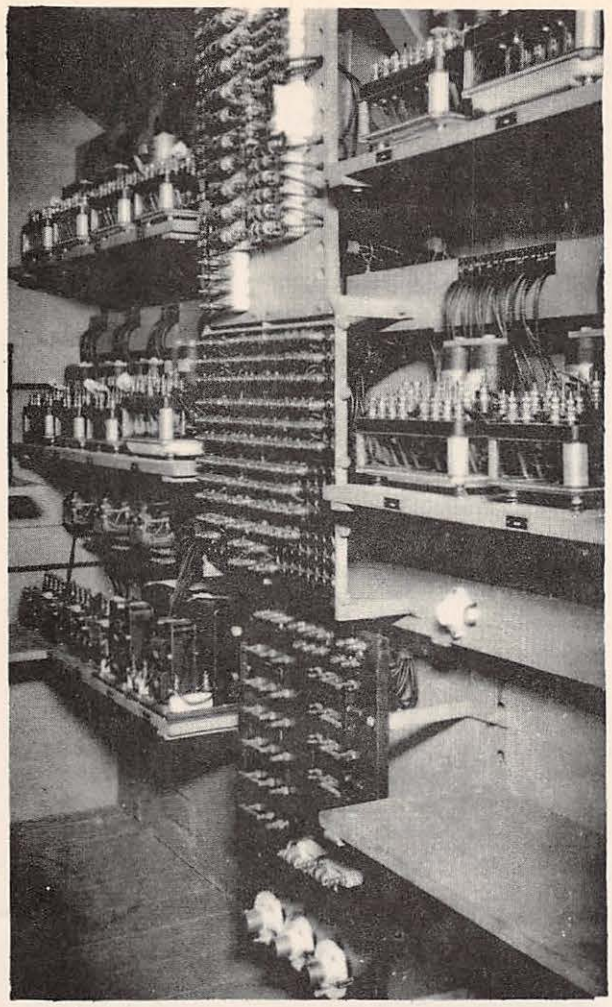


Fig. 3.....Interior View of Shelf Type Sheet Steel Relay House. This shows the general arrangement of the equipment, but Figures 2 and 6 provide a more comprehensive idea of the detail features.

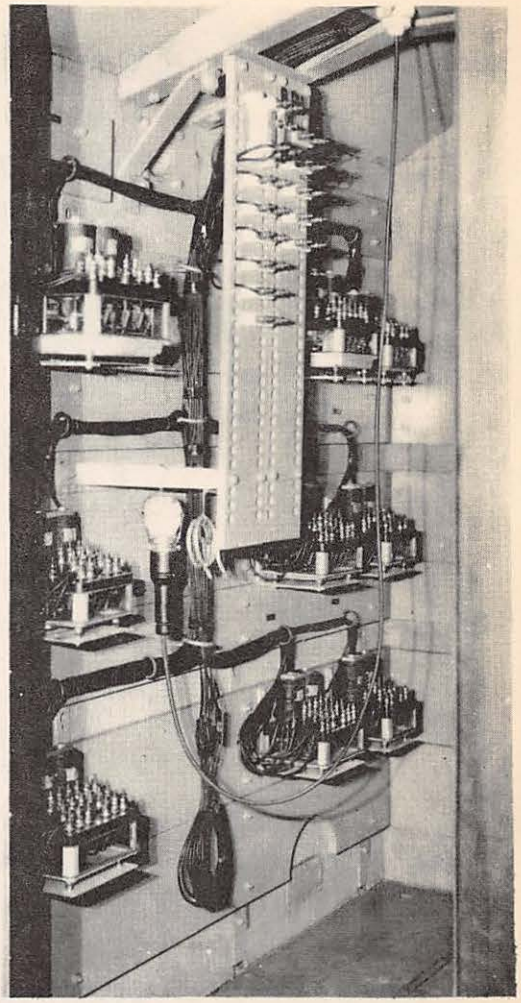


Fig. 4.....Interior View of Steel Relay House arranged for wall mounted relays. This design shows enamel bridle rings used to support wires. The wire chase method of carrying wires as shown in Figure 3 is usually preferred.

a steel panel (rather than glass) is used.

6. Flexibility - The arrangement of equipment is not fixed. Vertical mounting channels Fig. 1, having closely spaced bolt head slots, provide a way of securing wide variation in the location and arrangement of shelves, wall boards, wire chases, battery racks, special terminal and switch boards.

7. Roomy - Three sizes of houses are available; - 4 ft. 6 in. by 7 ft., 5 ft. by 7 ft., and 6 ft. by 9 ft. Each size provides for the efficient disposition of material and a

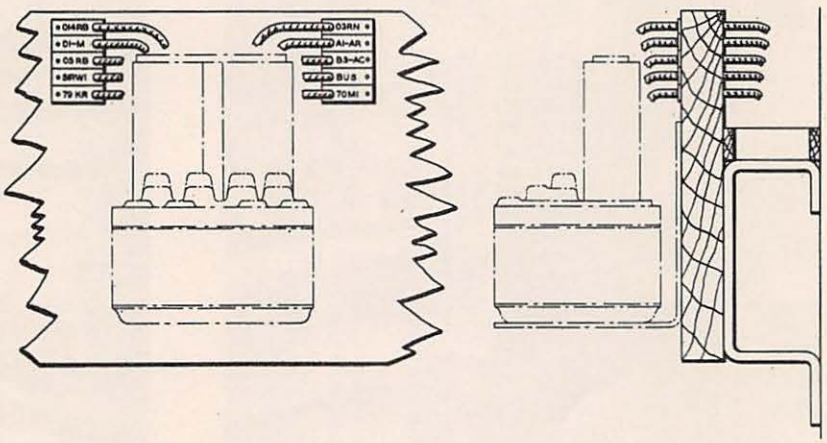


Fig. 5.....Wires pass through holes drilled in Wire Chase Front and also the holes in the marker tags.

generous allowance for head room. Another house 6 ft. by 11 ft. is contemplated and can be made economically from commercial size sheet steel plates.

8. Wiring Facilitated - Overhead wires may be brought in on either side, through a cable outlet (Fig. 1). Underground wires from the outside can readily be brought through the floor. The matched pine floor may be solid or furnished with a trap door when it is desired to place the house over a conduit manhole. The inside wires are carried in chases entirely open at the top. (See Fig. 2). One scheme of wiring used is to bring the wires through holes drilled in

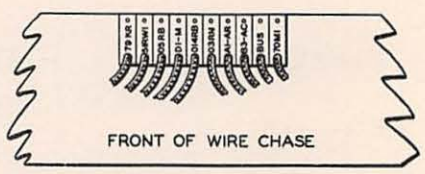


Fig. 6.....Arrangement of tags when relays are shelf mounted.

the front of the chase as shown in Figs. 5 and 6. It will be noted that the wires also pass through holes in the marker tags which are pinned to the chase front, eliminating the necessity of terminals. There is leeway in the size and disposal of the main terminal board to which outside connections are made. Smaller terminal boards conveniently arranged take care of battery and common wires and those cases where, otherwise, two or more wires would be placed on one relay terminal post. Other types of terminals also described in U.D. #184 may be used if desired.

9. Prewiring - When ordering Union Sheet Steel Houses in connection with associated control and power equipment, advantage may be taken of our "Prewiring" facilities whereby completely wired Houses are available. See S.I.S. (U.D.) 168, also Fig. 9 . Incidentally the experience gained in "Prewiring a large number of these houses has influenced the introduction of many novel appointments. If "Prewiring" cannot be carried out at our plant, worth while savings will result when it is accomplished by the construction forces at some centrally located headquarters.

10. Handling - Nothing so substantial and servicable as these houses can be moved far by hand. Provision is therefore made to simplify and make safe means for mechanical handling. Removal of the roof ventilator hood exposes an opening through which a cable or chain may be secured to an especially

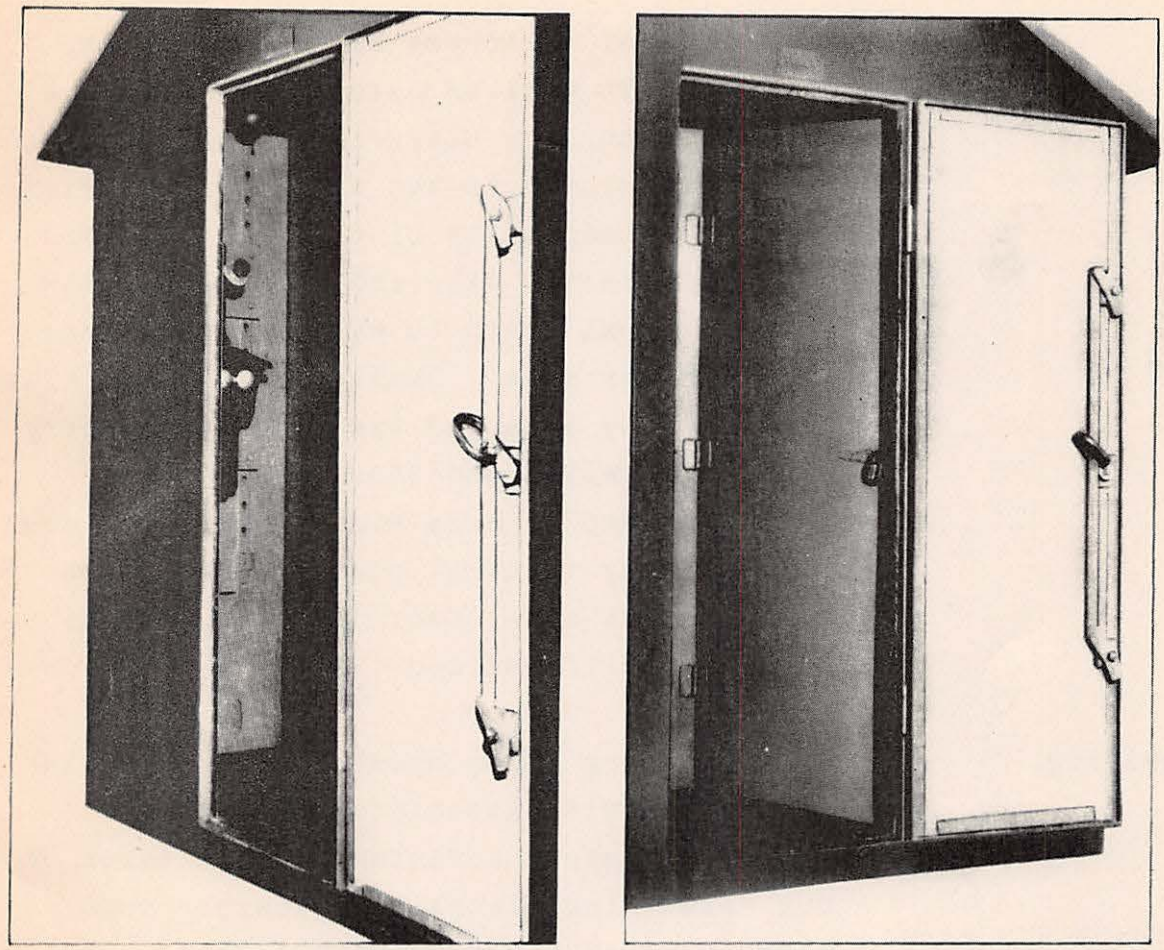


Fig. 7....These views show the inside of the door locking device; the left hand view shows the telephone compartment, the right hand view shows the door leading into the main or instrument compartment.

designed cross structure, advantageously located with respect to center of gravity and strong enough to carry the weight of the case without distortion. See Fig. 10.

11. Appearance - The external design is so conservative that it harmonizes with other substantial roadside structures. It has a double shed straight pitched roof with overhanging eaves. When shipped from our works it carries an outside coat of red lead and is ultimately painted the color selected as standard by the individual railroad

installing. The inside of the case is also coated with red lead paint before the Celotex lining is applied. After lining, the Celotex, shelves, supports, etc. are attractively painted. Unless otherwise specified by the purchaser, Aluminum paint will be used.

12. Protection - While Steel Relay Houses of the type described in U.D. (S.I.S.) #172 are suitable where the roadside space is limited, the Steel Relay House under discussion provides more adequate protection to wiremen and maintainers, against exposure to extreme weather conditions.

The need for the steel relay house depends mainly upon the amount of equipment which can be conveniently housed at one location. Our experience indicates that there is a growing tendency to group signal control equipment as much as possible. This is particularly true in installations of C.T.C., Remote Control, Interlocking and Multiple Track Automatic Signaling. Considering the Relay House from this angle, its adoption must be influenced by comparison with installations at present served by a number

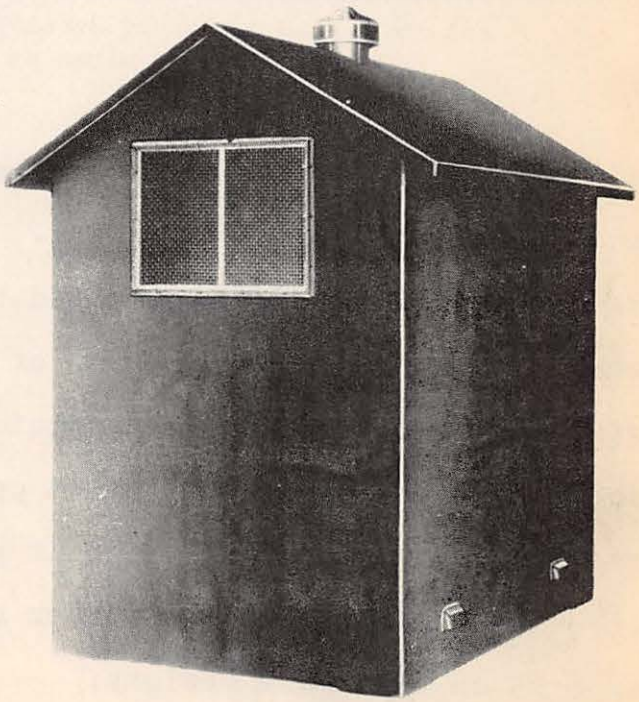


Fig. 8.....Rear View of Steel Relay House showing window and screen.

Fig. 9.....A number of Steel Relay Houses in the course of being wired at our factory.

of smaller scattered or grouped instrument houses, battery wells and occasional telephone booths. The need for large relay houses is not new as has been indicated by their use in many signal installations in the past. Some of these houses have been constructed on the ground, some factory built and shipped in knocked-down form, and others of formed concrete construction; all have received criticisms for apparent weaknesses. The present design of Union Steel Relay House under discussion has been based upon experience with past designs.

* * * * *

ECONOMY

Some of the economical factors of the Union Steel Relay House have previously been mentioned but a summary is necessary to bring out the real worth of the house.

1. The construction is so rugged and substantial that little or no additional expense (outside of painting) will be required after installation.

2. It will provide real protection to the equipment housed therein. There are no seams or joints to open and allow snow, dust or water to enter the house. The ventilators in the top and bottom may be regulated as desired. These facts, therefore, provide lasting insurance against damage to the contents.

3. Should alterations ever be necessary in the arrangement of shelves, the mounting construction is such that these can readily be made at reasonable expense.

4. In all probability from four to eight small metal instrument cases would be required to house apparatus in quantities equivalent to the capacity of one large steel house. Even if the cost of the instrument cases should not be in excess of the large steel house, the expense of interwiring between individual cases would react in favor of the use of the single large house.

5. Construction costs are considerably reduced by provisions made in this type of house that the equipment may be secured in place for shipment and all local wiring can be done at the factory or railroad headquarters. A resultant indirect saving is that the actual time for installation at each location is reduced to a minimum.

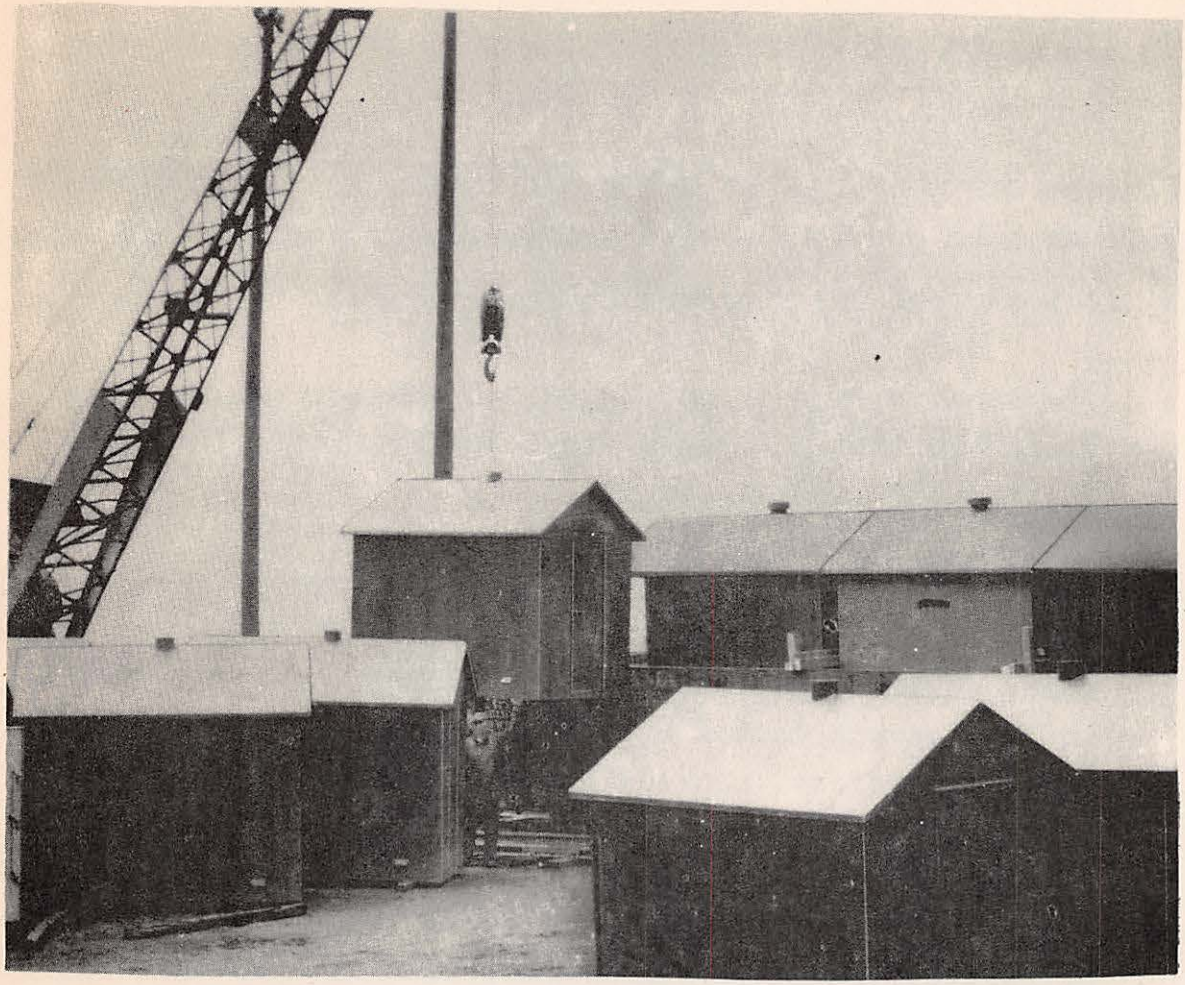


Fig. 10....An efficient method of loading Steel Relay Houses on a gondola car.

6. If the internal wiring is done at the point of location, weather conditions do not interfere, since the wiremen would be entirely under cover and no loss of time results.

7. The expense of additional shanties for housing telephones or other miscellaneous equipment to which trainmen must have access, is eliminated, as a separate compartment, suitably partitioned from the control equipment, may readily be provided.

8. Considering the cost and nature of the equipment so housed, the Union Steel Relay House as constructed, amply justifies installation.

Complete references and instructions for ordering Union Steel Relay Houses are given in catalog Plates L-2000 to L-2054.

H. H. Cadwallader 8/6/31

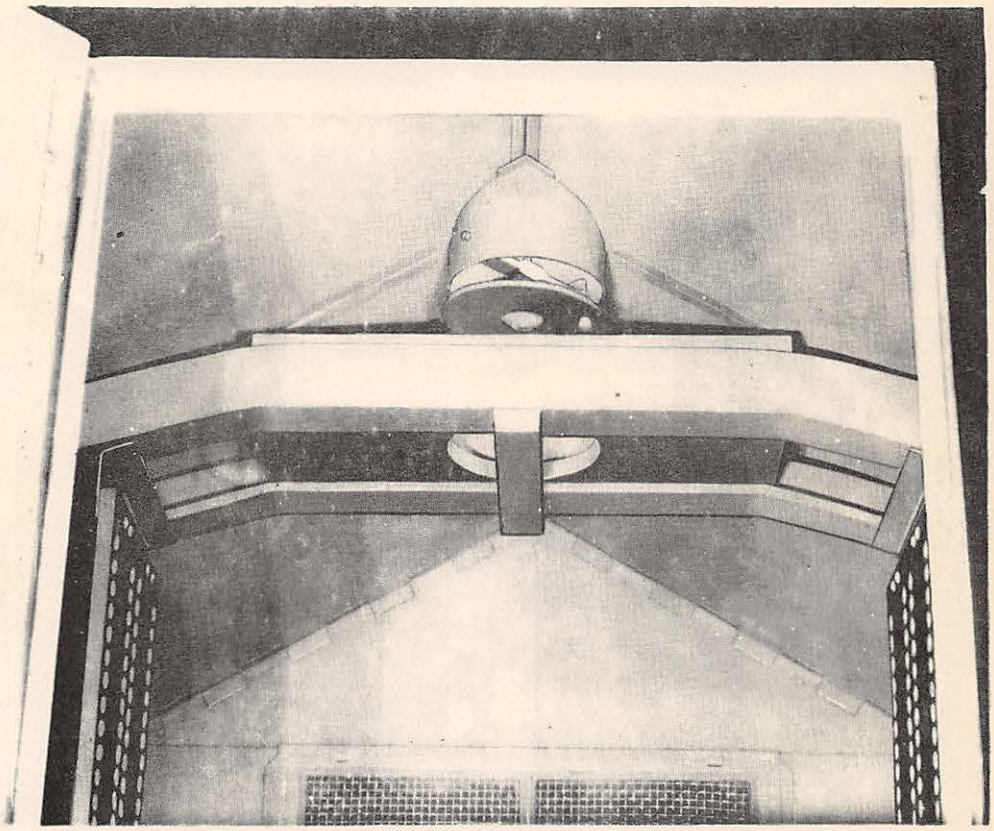
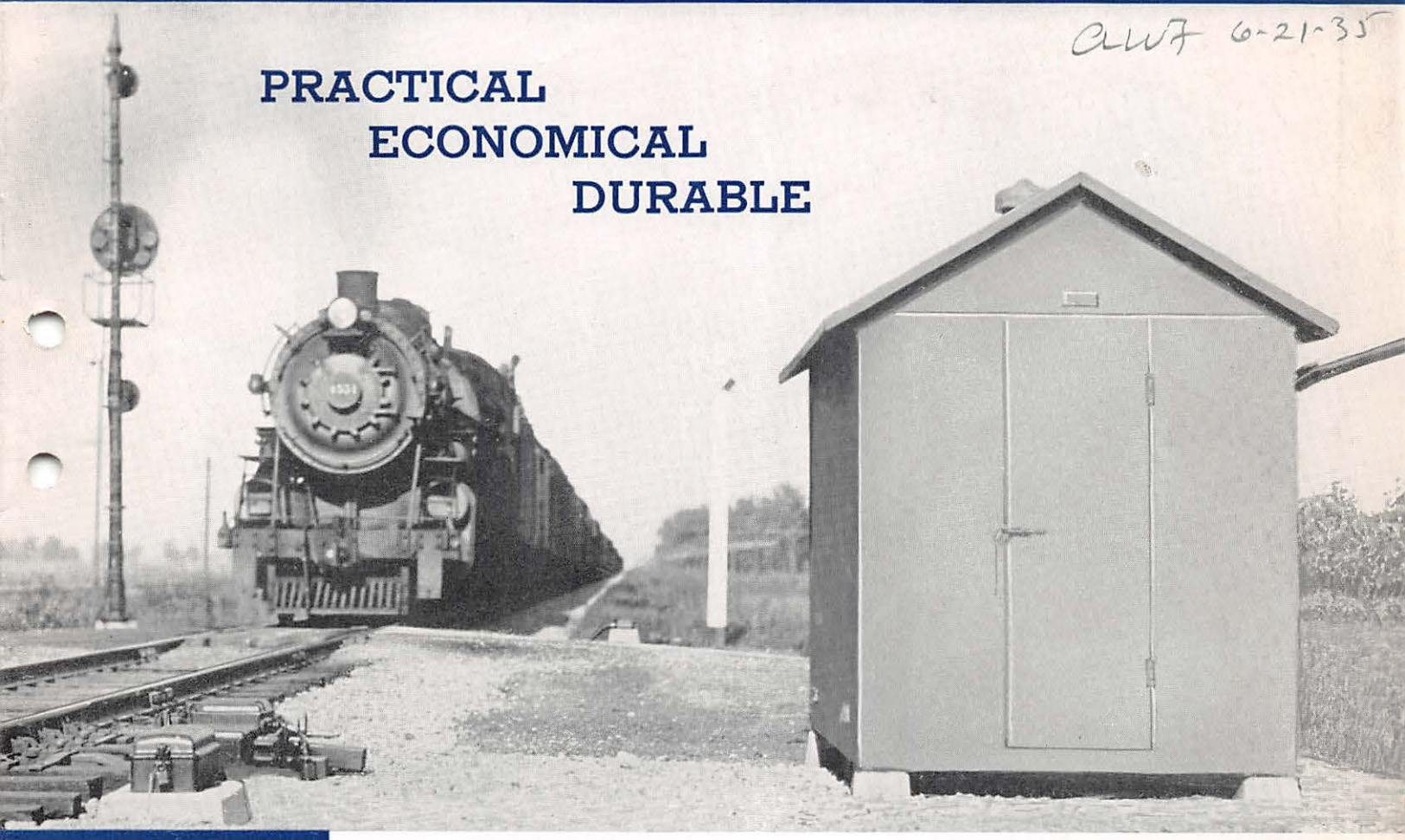


Fig. 11.....View showing inside of top ventilator , overhead wire chase and cross bar around which chain or sling is fastened for handling.

"Union" Steel Relay Houses

CLW 6-21-35

PRACTICAL
ECONOMICAL
DURABLE



PUBLICATION
No. 186-S

The utility of Union Welded Steel Relay Houses has been demonstrated by their extensive application to growing needs in the field of Railway Signaling. No halfway measures were used in the original designs, with the result that after years of service, few modifications have been made other than provisions for greater variety in sizes and improved facilities for wiring and disposal of apparatus.

The Houses illustrated and described in this publication are of the double door type. One door, when opened, exposes the back of a large terminal board and a 22¼″x5″ channel in the floor for leading in underground wires and cables. Considerable floor space is saved by setting the terminal board close to the door, and convenient means are provided for termination of both internal and external wires. » » » » » » » » » »

1881 1935

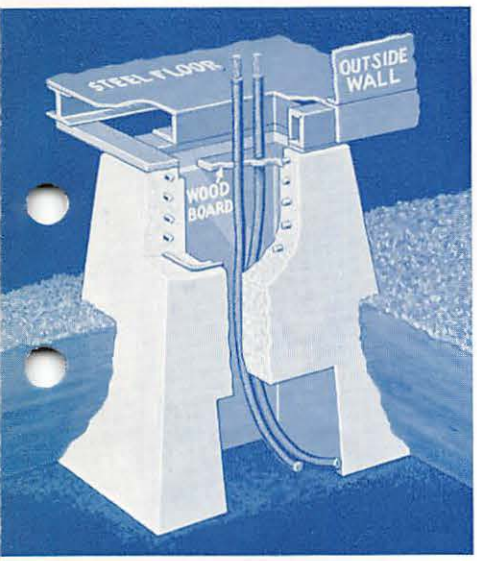
DISTRICT OFFICES

NEW YORK CHICAGO
MONTREAL ST. LOUIS
SAN FRANCISCO

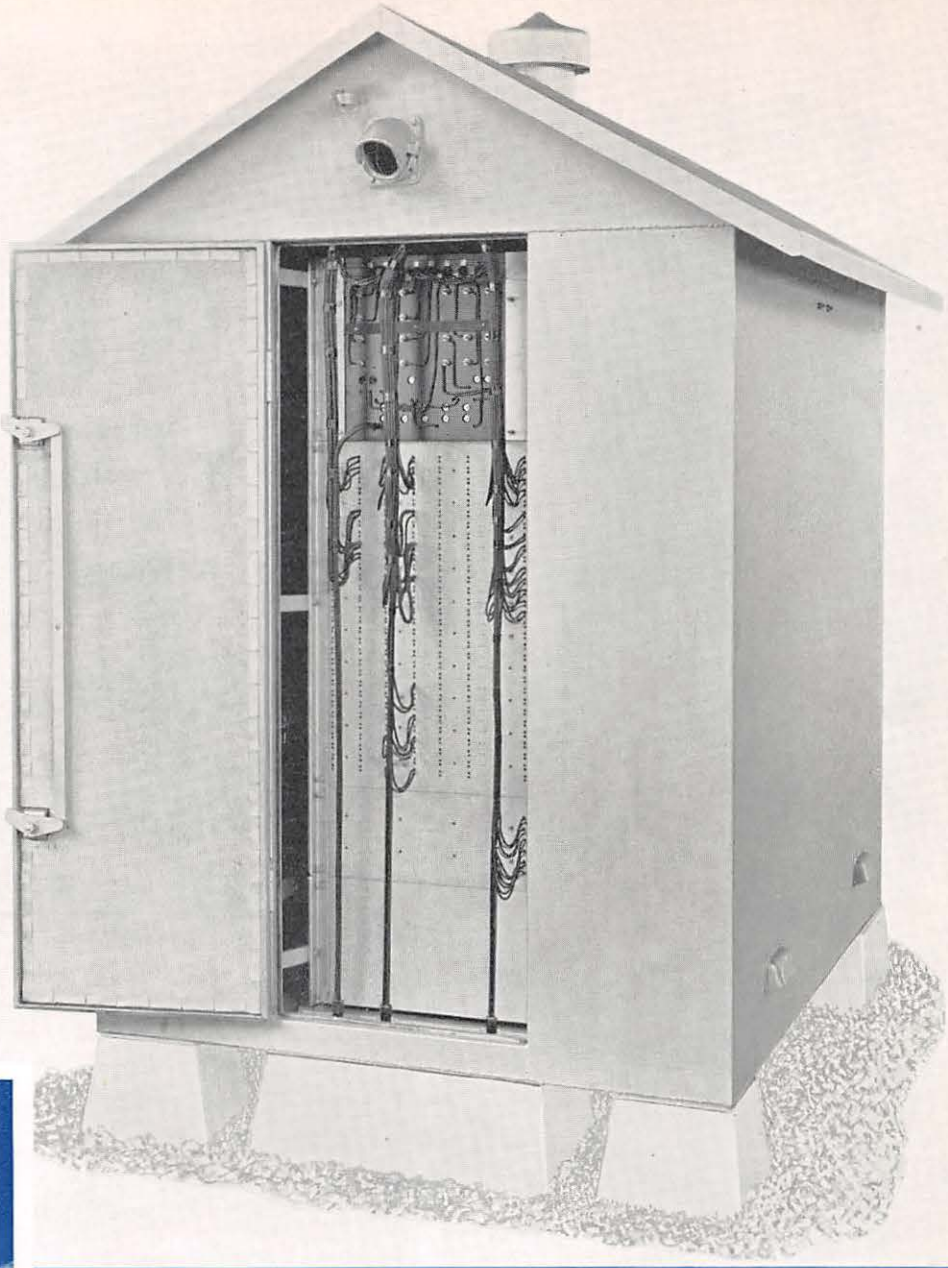
UNION SWITCH & SIGNAL CO. SWISSVALE, PENNA.

Union Steel Relay House . . . Size 8'-7"x12'

The extra door facilitates wiring and inspection of the terminal and switch board. Exterior underground cables and wires will be brought up thru the channel in the floor at the back of the terminal board; exterior wires going to the pole line will be taken thru the cable outlet at the gable. As every joint in the wall or roof would be a potential opportunity for leaks and deterioration, Union Houses have few joints and these are seam arc welded throughout their entire lengths. The sides of all size houses are one piece copper bearing rust resisting sheet steel, the thickness of which may be $\frac{1}{8}$" or $\frac{3}{16}$" depending on the size of the house. The use of steel flooring protects the contents of the house against damage from grass fires. Union Steel Relay Houses are thus SUBSTANTIAL, DURABLE and FIREPROOF.



The broken sectional view above shows the manner in which parkway cables are brought thru the channel at the back of the terminal board and shows how the opening is sealed. » » » » » »

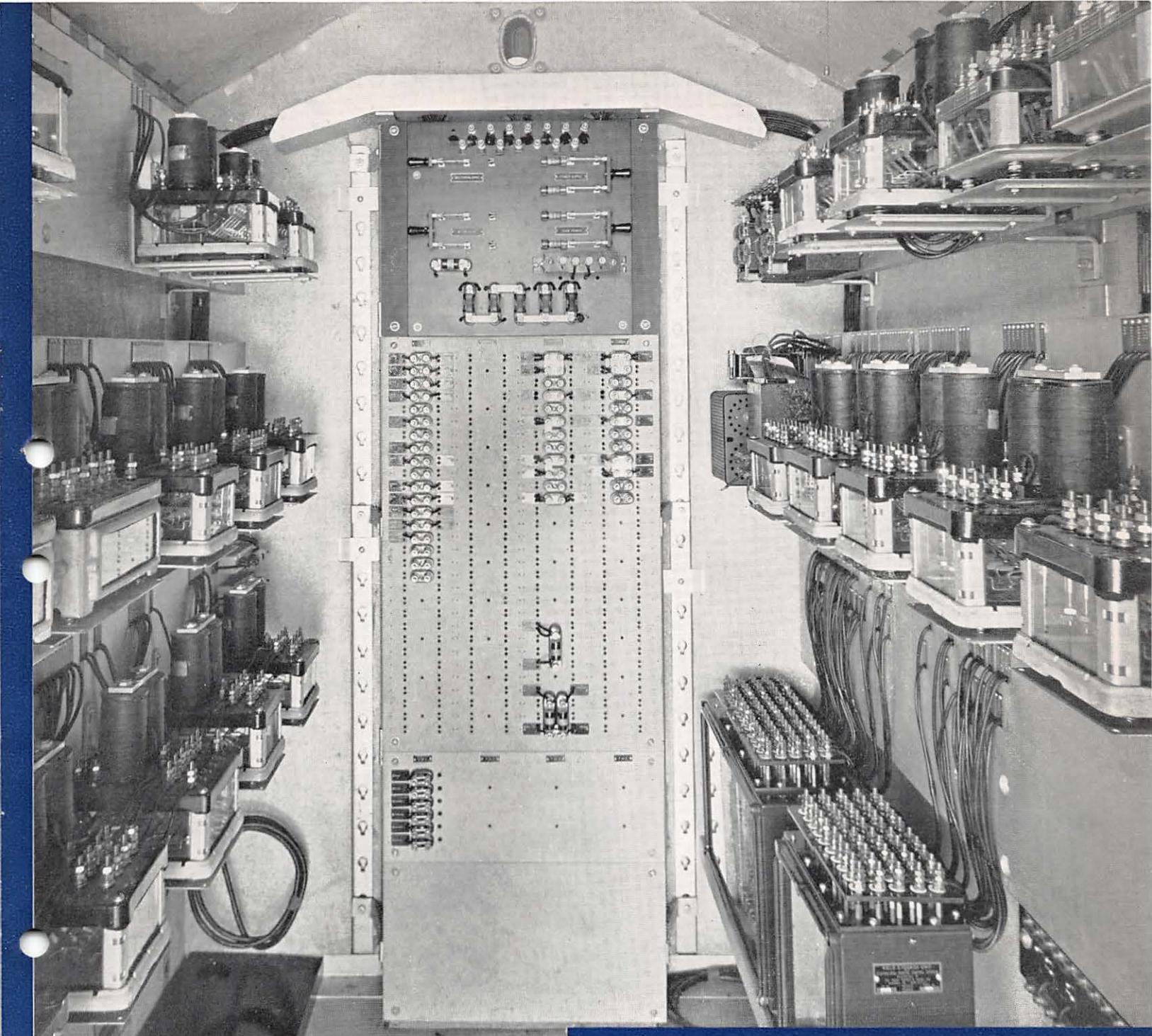


Union Relay House . . Size 5′x7′

A back door is used in this house to facilitate wiring and inspection of the terminal and switch board. Provision is made for pouring a sealing compound around the incoming parkway cables, in the recess above the board shown in the view at left, so as to exclude mice or destructive insects. Doors two feet wide are snugly fitted and weatherstripped and have a substantial two point locking device. The door behind the terminal board cannot be unlocked from the outside. Screened ventilators in the roof and at the lower sides provide for air circulation and prevent sweating. The inside surfaces of walls, doors and roof are effectively lined with Celotex to protect the apparatus from extreme heat or cold. Union Steel Relay Houses are thus INSULATED, VENTILATED and WEATHERPROOFED. » » » » » » » » » »

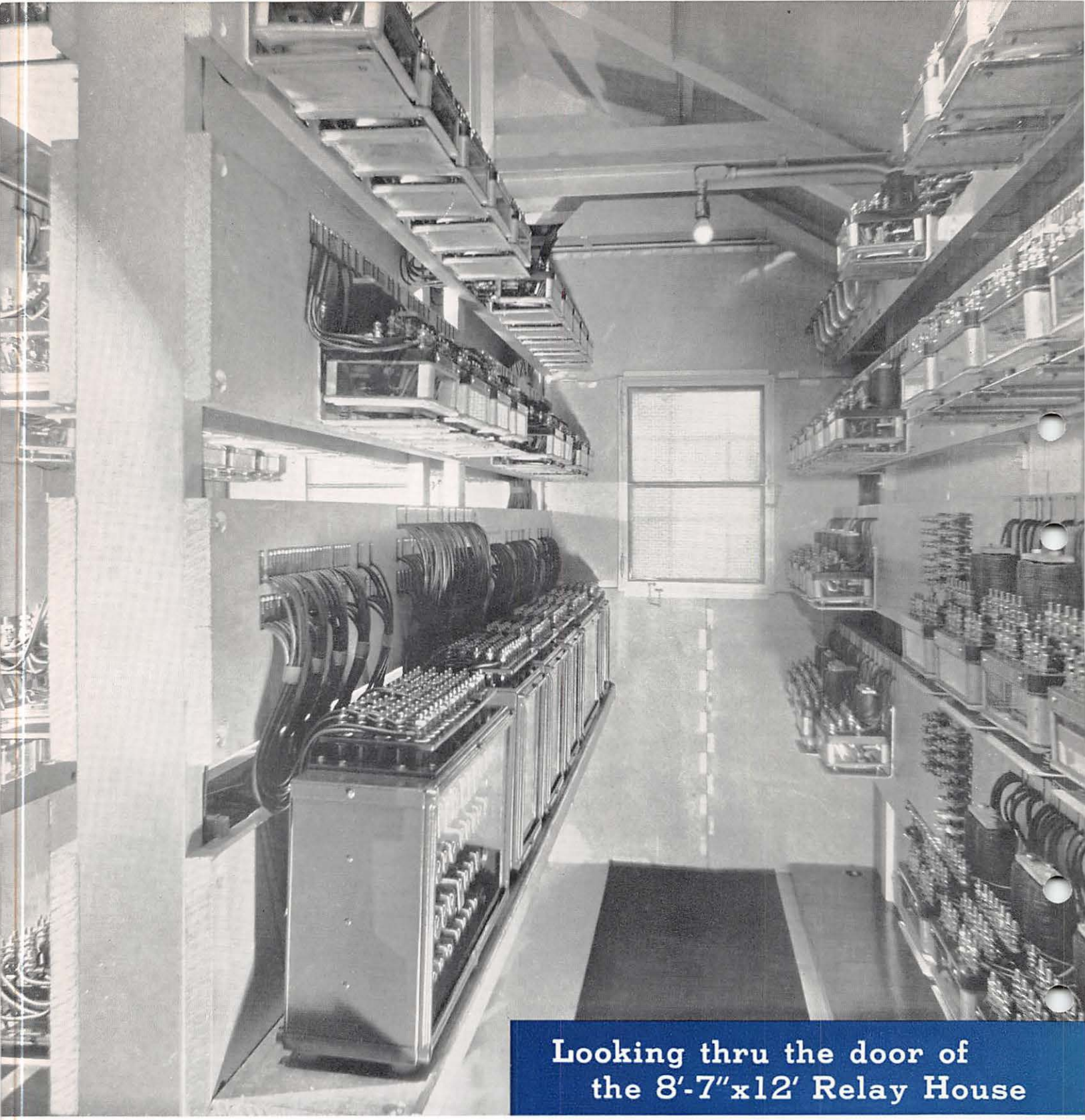
Interior of 8′-7″ x12′ House

Wiring, though accessible, is kept concealed as far as possible in suitable wire chases. The means shown for tagging (nomenclature) wires is highly recommended for convenience of inspection and alteration of wiring. Where some of these facilities are not desired and more concentration of equipment is wanted, it is possible to install one or two more tiers of apparatus, since Union Relays, in spite of their ruggedness, require a minimum of mounting space. Additional panels may also be added above the switch board for lightning arresters, etc. In the house illustrated, a space factor of 25% has been provided for subsequent disposal of additional apparatus. Union Steel Relay Houses therefore provide considerable FACILITY and FLEXIBILITY for disposal of wires and apparatus. » » » » » » » »



Interior of 5′x7′ House

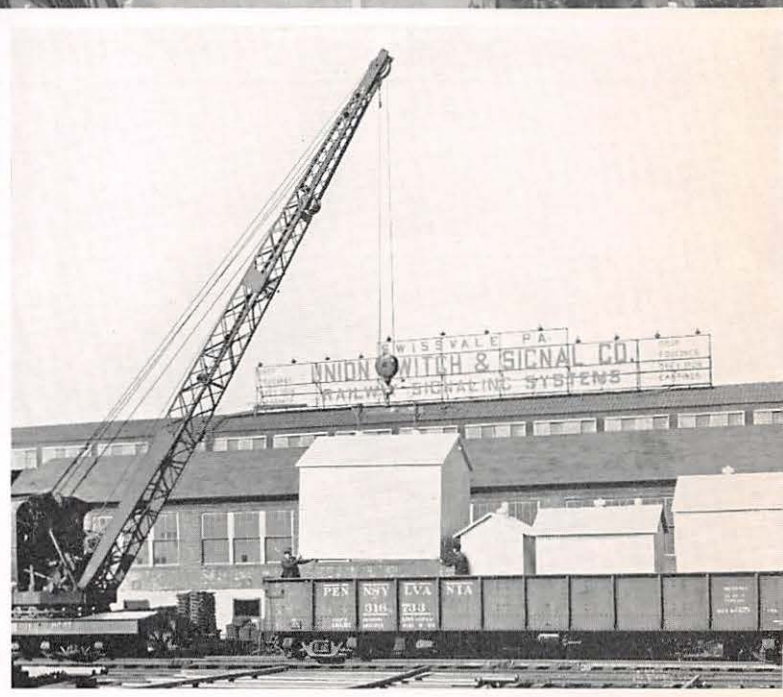
The terminal board is mounted 8″ from an end wall, close to both the underground and aerial cable inlets. A door located directly behind the board provides access for all necessary connections being made conveniently. With this arrangement, the apparatus mounted on the sides may extend to the end walls without being seriously obstructed. The drilling and size of the "Transite" terminal panels can be varied to suit any arrangement of terminals, lightning arresters or fuses desired by the customer. Vertical button-holed mounting channels of the same type shown at the sides of the terminal board are set in the side walls for adjustable mounting of shelves or wall boards. Thus MAXIMUM UTILITY of floor and wall mounting space is obtained without sacrificing other desirable advantages. » » »



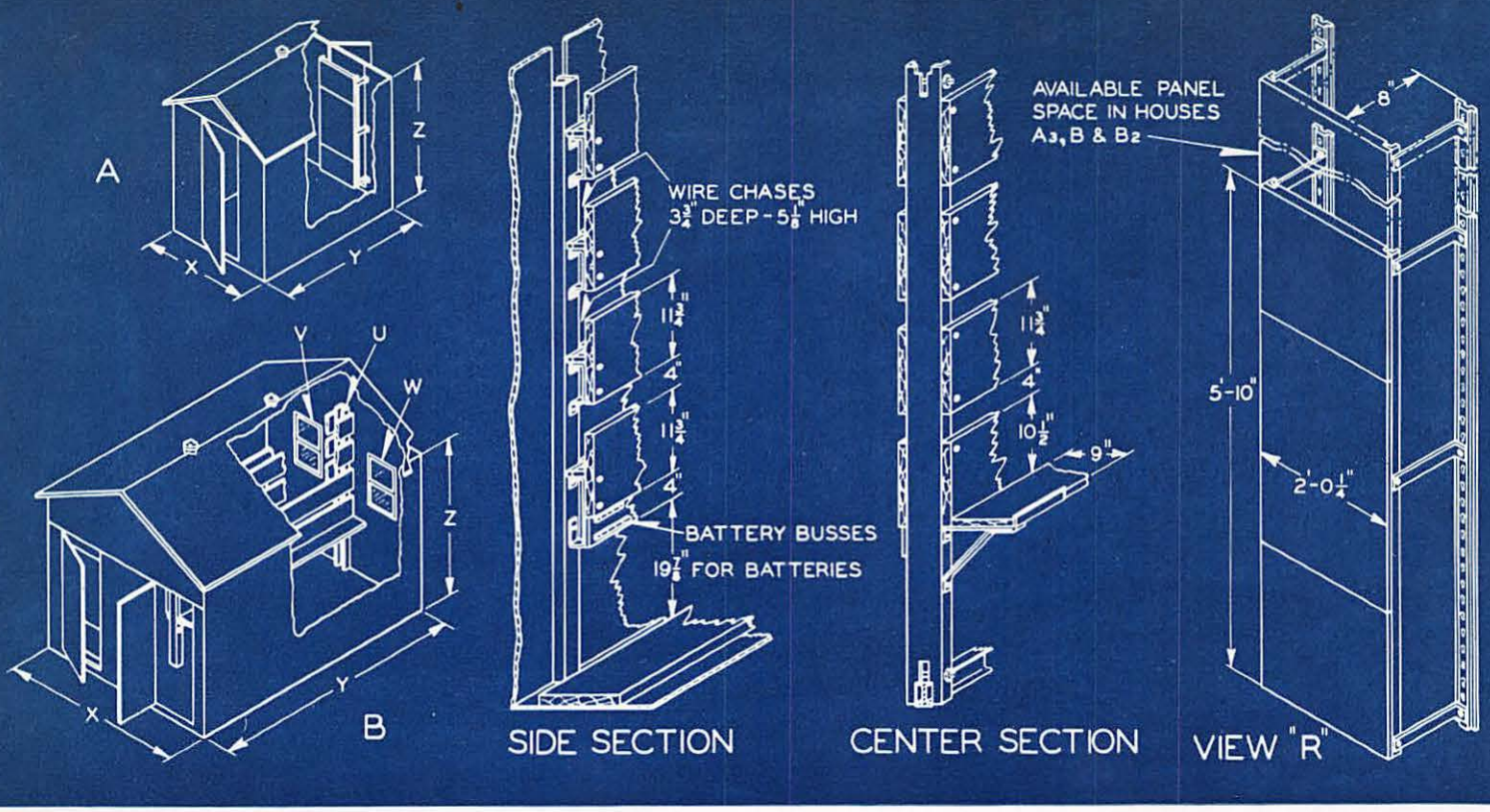
Looking thru the door of the 8′-7″x12′ Relay House

In order to secure desirable and economical grouping of the apparatus, a back to back central row of mounting boards has been used. Note that the terminals on top of the C.T.C. units are of the plug-in-type which permits quick removal of the units for shipment, testing or replacement. Storage batteries will set on the floor board at the right. Above these, on a 4″ insulated terminal strip, are two bus bars with terminals for convenient connection of individual circuits. In this size of house, there are four overhead wire chases . . . all these features tending to REDUCE THE LENGTH OF WIRE RUNS. » »

Ready for Shipment . . .



The larger view above illustrates a very successful manner of fastening the equipment in place for shipment. Temporary boards are placed under the relays which in turn are tied down with two strands of bale wire. Experience demonstrates that even with very rough handling, Union Wired Houses reach their destination in PERFECT CONDITION. The small view shows a method of handling Union Steel Relay Houses. This view used in conjunction with the larger illustration, wherein one of the derrick chain slings is shown fastened around an inside cross girder, indicates that all necessary provisions have been made to facilitate SAFE and EFFICIENT HANDLING . . . . In emphasizing the advantages of Union Steel Relay Houses we have indirectly drawn attention to some practical and economical reasons why Factory wired Relay and Instrument Cases should be used more extensively. » » » »



WHEN ordering Steel Relay Houses from the following tabulation, mention the reference and description of the house which has the desired total lineal feet of mounting space.

Ref.	STANDARD SIZES			Height to Top of Ventilator	Shelves and Wall Boards					Drawing D-2399 Sheet
	Width "X"	Length "Y"	Height "Z"		* Tiers	Length Sides	Length Center	Length End	Total Lineal Ft.	
A	5′	7′	6′–4″	8′–5″	3	6′–10″	.....	≠	41′–0″	30
A2	6′	9′	6′–4″	8′–8½″	3	8′–10″	.....	≠	53′–0″	29
A3	6′	9′	7′–8½″	10′–1″	4	8′–10″	.....	≠	70′–8″	33
B	8′–7″	9′	7′–8½″	10′–9½″	4	8′–10″	6′–6″	≠ °	122′–8″	32
B2	8′–7″	12′	7′–8½″	10′–9½″	4	11′–10″	9′–6″	≠ °	170′–8″	27

*There is also room for batteries to be set on the floorboard.

≠ End panel board (View "R") provides additional mounting space for terminals, switches, fuses, lightning arresters, etc.

°If center row "U" is not wanted, end wall is available for mounting space.

SPECIAL INFORMATION:

The houses listed are economical sizes. If internal requirements are of a special nature, it will be found that alterations in the disposal of facilities can be arranged. For other houses without extra door behind terminal board and for shelf type of mounting, see Catalog Plates L-2000 to L-2050.

If houses are to be factory wired, a complete wiring plan should be supplied. Factory wired houses are completely equipped with electric lighting, aisle mat, battery bus bars and terminals. » » » Windows V and W, shown in diagram B, are eliminated unless specified. » » » » » »